

BOOK REVIEWS

THE BIOCHEMISTRY OF ALKALOIDS, by Trevor Robinson, with pp. viii + 225 and 35 figures. 2nd ed. New York, Heidelberg, Berlin: Springer-Verlag, 1981. Volume 3 in the series "Molecular Biology, Biochemistry and Biophysics". DM 88, approx. US\$ 41.00. ISBN 0-387-10795-9.

This book is one of the series, *Molecular Biology, Biochemistry and Biophysics*, edited by A. Kleinzeller, G. F. Springer and H. G. Wittmann. It will be of interest to plant biochemists, pharmacologists and natural product chemists.

The contents of this publication have been structured into three major sections. The first two chapters are introductory chapters which deal with the definition of alkaloids, their chemical classification based on their carbon-nitrogen skeletons, their distribution in nature, their taxonomic significance, the localisation of alkaloids within the plant, ontogenetic changes in the alkaloid content of the plant, the function of alkaloids in the plant and finally a summary of the general theories of alkaloid biosynthesis. The treatment of the major groups of alkaloids then follows with the emphasis on biosynthesis. In recent years one of the most exciting developments in the field of alkaloid biosynthesis has been the identification of some of the enzymes which regulate the formation of these compounds. This important body of work has been incorporated throughout these chapters. The final section deals firstly with the metabolism of alkaloids by animals, micro-organisms and higher plants and secondly with their pharmacologic and toxicologic effects.

The book, in hard cover and measuring 170 × 250 mm, is very well written and the quality of production is excellent. There are very few errors. The figures and tables are adequate although on a number of occasions names of alkaloids are mentioned in the text but no formulae are given. References for each chapter are grouped at the end of the chapter and the literature has been covered through to June 1980.

This book can be recommended for postgraduate students and for research workers.

W. E. CAMPBELL

BASIDIUM AND BASIDIOCARP: EVOLUTION, CYTOLOGY, FUNCTION AND DEVELOPMENT, edited by Kenneth Wells and Ellinor K. Wells, with pp. xi + 187 and 117 figures. New York, Heidelberg, Berlin: Springer-Verlag, 1982. DM 89, approx. US\$ 39.60. ISBN 3540-90631-2.

Another fine book in the *Springer Series in Microbiology* (Editor: Mortimer P. Starr) in which a comprehensive review is given of some recent studies on basidiomycetes. This major class of the Fungi is examined from multidisciplinary viewpoints—taxonomic, cytological, molecular biological, physiological and biochemical. A variety of experimental techniques are employed and special emphasis is placed on the basidium and the basidiocarp.

Oberwinkel stresses the importance of comparative morphological studies of the basidium and basidiospore as a means of understanding evolution within the Basidiomycotina. McLaughlin reviews the non-nuclear events during basidial and basidiospore ontogeny while Thielke examines recent studies of meiosis in the basidium, especially those dealing with the spindle apparatus and associated structures. Lu's studies of meiosis in the basidia of *Coprinus cinereus* have extended the information available on this process to the molecular level. Uno and Ishikawa describe a series of studies suggesting that adenosine 3'5'-cyclic monophosphate is an essential component in the initiation of basidiocarp formation in a form of *Coprinus macrorrhizus*. Gruen has brought together the results of his own extensive studies, and those of others on the influence of the pileus and somatic mycelium on stipe elongation during the rapid expansion stage. He also reviews and discusses the evidence that the somatic mycelium and/or nutrients enhance stipe elongation and that the numbers of hyphal segments increase during this phase. Completing the studies described by Gruen is the report by Gooday, who describes his efforts to determine which hyphal constituents control stipe elongation by analyzing chemically the major components before and after the major period of elongation.

In addition to the detailed reference list at the end of each chapter, an author index and a good subject index are provided. The book is pleasingly printed, has many good informative photomicrographs and can be recommended as reference for post-graduate courses in Mycology. Most mycologist will find something of value in this book.

ALBERT EICKER

BIOCHEMISTRY AND PHYSIOLOGY OF HERBICIDE ACTION, by C. Fedtke, with pp. xi + 202, 43 figures and 58 tables. Berlin, Heidelberg, New York: Springer-Verlag, 1982. DM 156, approx. US\$ 69.30. ISBN 3-540-11231-6.

Intensive research has been conducted into the properties and characteristics of modern herbicides. These substances are of great economic importance. In this book Dr. Fedtke clearly shows that they are of very considerable scientific importance as well, a fact that is not always adequately appreciated. The nature and scope of the book can best be described in this excerpt from the Foreword. "This book describes the effects of herbicides on the metabolism of higher plants from the viewpoint of the plant physiologist. The material of this book is therefore, as far as possible, divided into areas of metabolism. This book intends (1) to present the reader with current knowledge and views in the area of herbicide modes of action and (2) to promote the future use of herbicides as metabolic inhibitors in plant physiological research to the advantage of both, the pesticide and plant science".

The book is written in a clear, concise manner, with clear illustrations and tables. The structural formulae for the compounds discussed are given. The bibliography is excellent and very valuable.

Until this book appeared, it was difficult to find all this information in one place, although some of it was readily available. However, the fact that all this material is contained in the one volume makes this book so valuable for plant physiologists. They can readily integrate this material into their own studies and it is in an ideal form for study by advanced level students and postgraduates. All the colleagues to whom I showed this book were very impressed with it and felt it filled a serious gap on our shelves.

There is too much detailed information in this book to be able to discuss its contents in detail. But to get an impression of the systematic approach of the author, a look at the chapter headings is very useful. Due to lack of space the sub sections of the chapters cannot be given, but in Chapter C—Photosynthesis—there are eleven sub sections with titles like—Inhibition of Photosynthetic Electron Flow and Physiological Effects Induced by Herbicides that Inhibit Photosynthesis. There are also 436 references cited in this chapter, which is the longest in the book and takes up half the text.

Contents

- A. Approaches to and Definitions of Mechanisms of Herbicides
- B. Plant Metabolism—a Synopsis of Principles
- C. Photosynthesis
- D. Energy Conversion
- E. Nucleic Acid and Protein Synthesis
- F. Microtubules
- G. Lipid Metabolism
- H. Herbicidal Germination Inhibitors with Unknown Mode of Action
- I. Herbicides with Auxin Activity
- K. Auxin-Inhibitor Herbicides
- L. Aromatic Amino Acid Biosynthesis
- M. Other Herbicides and Mechanisms

The influence that herbicides had upon nitrogen metabolism was of considerable interest to the reviewer as was the matter relating to auxin activity. But the book is packed with valuable interesting information. Dr. Fedtke has succeeded in the first of his stated aims and his second one, to promote the use of herbicides as metabolic inhibitors in research, is sure to follow the reading of this book by experimentalists.

Highly recommended for plant physiologists, plant biochemists and other plant scientists as well as graduate or senior students.

K. H. SCHÜTTE

NUCLEIC ACIDS AND PROTEINS IN PLANTS 1: STRUCTURE, BIOCHEMISTRY AND PHYSIOLOGY OF PROTEINS, edited by D. Boulter and B. Parthier, with pp. xx + 768 and 135 figures. Berlin, Heidelberg, New York: Springer-Verlag, 1982. DM 268, approx. US\$ 119. ISBN 3-540-11008-9.

The vast volume of information accumulated on plant physiological processes as well as the rapid advances in the technology associated with this field of science over the last 15 years necessitated the publishing of a new series of *Encyclopedia of Plant Physiology*. That all libraries should have these books on their shelves is essential.

The present book, Volume 14A, covers a wide range of topics. These were reviewed by recognised experts in their fields. The editors succeeded in reducing overlap to a level which is essential for clarity and continuity in the text. The 17 chapters all contribute to a better understanding of the role of nucleic acids and proteins in plants. In order to achieve this understanding the Volume was divided into two sections. In the first, topics related to the biosynthesis and metabolism of protein amino acids and proteins were covered. Thus attention was given to ammonia assimilation and amino acid metabolism; transfer RNA and aminoacyl-tRNA synthetases in plants; ribosomes, polysomes and the translation process; post translational modifica-

tions; protein degradation; physiological aspects of protein turnover; structures of proteins; protein types and distribution; cereal storage proteins, structure and role in agriculture and food technology; biochemistry and physiology of leaf proteins; microtubule proteins and P-proteins; plant peptides; and immunology.

In the second section entitled "Nucleic acids and proteins in relation to specific plant physiological processes" attention was given to seed development; protein and nucleic acid synthesis during seed germination and early seedling growth; leaf senescence; and macromolecular aspects of cell wall differentiation.

Throughout this very neatly presented volume, in which the printing and figures are of the highest quality, the authors attempted to state what is currently known and how our knowledge has changed over the past two decades. In many cases they identified and indicated future areas of research. This should prove most useful for both lecturers and students working on proteins and in the general field of nitrogen metabolism. This thorough review of the literature ensures that this volume will serve as a reference book for many years to come both at the undergraduate and postgraduate levels.

J. VAN STADEN